

# Key.

## 1.5 – Thermodynamics – Reading Questions

Read pages 256-258 and answer questions 1-6.

1. What law in science is equivalent to the first law of thermodynamics? Re-state this law in general terms as you know it.

the law of conservation of energy.  
→ energy can not be created or destroyed, it can only change forms.

2. What is thermodynamics?

- the study of heat and its properties.  
(thermal energy)

3. What is the purpose of a heat engine? What everyday device uses a heat engine? What is the main purpose of the mechanical energy produced for by this device?

- convert thermal energy into mechanical energy.  
- a car (vehicle)  
- move the vehicle

4. Which direction does heat flow?

from a warm body to a cooler body  
(from hot to cold),

5. Explain how a refrigerator works.

- freon is transported into fridge which removes heat from the contents.  
- freon is then removed from the fridge which releases the absorbed heat to the room.

6. What is a heat pump? Briefly explain its two purposes and how these purposes get carried out.

- a "two directional refrigerator"

- ~~the~~ purpose 1 - heat home by removing heat from outside and putting it into home.  
purpose 2 - cool home by removing heat from inside and releasing it outside.

The following questions are review questions from the unit as a whole.

7. Old fashion heating systems sent steam into radiators in each room. In the radiator, the steam condensed back into water. How did this heat the room?

→ the condensation releases the heat of vaporization to convert steam to water. This released heat warms the room.

8. When a warmer object is in contact with a colder one, does temperature flow from one to the other? Do the two have the same temperature change?

TEMPERATURE does not flow, but heat does. Heat can only flow from the warm to the cool, not a two way flow.

- the temperature change will only be the same under specific conditions since each substance has a unique specific heat capacity.
9. Can you add thermal energy to an object without increasing its temperature? Explain.

Yes during a phase change (changing states).

10. When wax freezes, is energy absorbed or released by the wax?

released.

11. Why does water in a canteen remain cooler if the canteen is covered in a canvas that is kept wet?

- the water removes heat from the canteen to evaporate, keeping water cool.

- the water also has a high specific heat, so it takes a while for the water to warm up and the canteen can't get warm until the canvas does.

12. Are the coils of an air conditioner that are inside the house the location of vaporizing or condensation for the Freon? Explain.

Vaporizing because we want heat to be removed from house and go into the freon.